

GHARANDAL SURVEY 1997: AIR PHOTO INTERPRETATION AND GROUND VERIFICATION

by

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with the assistance of Julie Kennedy

No formal field survey has yet been carried out in the vicinity of the village of Gharandal. Sites have been noted there, not least by Nelson Glueck, but a formal and systematic survey of the region is planned for a future season. In anticipation of that, the author was invited by the Director, Alan Walmsley, to examine and interpret air photographs of the intended survey area. The objective for Walmsley was as a preparation for field survey; for the author it offered the opportunity to evaluate the photographs for a region being examined as part of an existing project.² Happily the author was then able to join the excavation and two days (4 - 5 May 1997) were devoted to verifying on the ground some of the "sites" identified on the air photographs.³ It is hoped that further sites may be followed up in 1998 but the results are already significant and merit a preliminary report here.

The Survey Area

The intended survey will extend over an irregular area, about 12 km E-W by 7 N-S, some 50 sq km (Fig. 1). The landform is hilly but consists of a high plateau overlooking often spectacular views on the west, not least the Dānā National Park on the SW.

In the SE the land is over 1600 m high, falling by more than 500 m as one travels NW. All along the W, however, the land

then falls away very steeply leaving a number of tongues of land on which villages lie. Best known of these is Buṣayra in the NW. Gharandal itself lies just E of the centre of this area. Other modern settlements are recorded on the 1:50,000 map (K737 "ash-Shawbak" 3151 III) at "Umm Dāyifa" (sic) and "ar-Rashādiyya". Other notable features recorded there are four springs recorded by name, all along the W and NW where the land begins to drop westwards very steeply.

Previously Recorded Archaeological Evidence

The most convenient source of information is now the immensely useful JADIS volume (Palumbo 1994). Table 1 sets out the list of 12, perhaps 13, sites, the names there being variants on the spelling on the map.

Of these, the Iron Age site of Buṣayra is certainly the best-known, not least from the excavations of Crystal Bennett (1973; 1974; 1975; 1977) while Gharandal itself, largely Roman to Early Islamic is reported on elsewhere (Walmsley, this volume; cf. Walmsley 1989 and Walmsley and Ricklefs 1997).

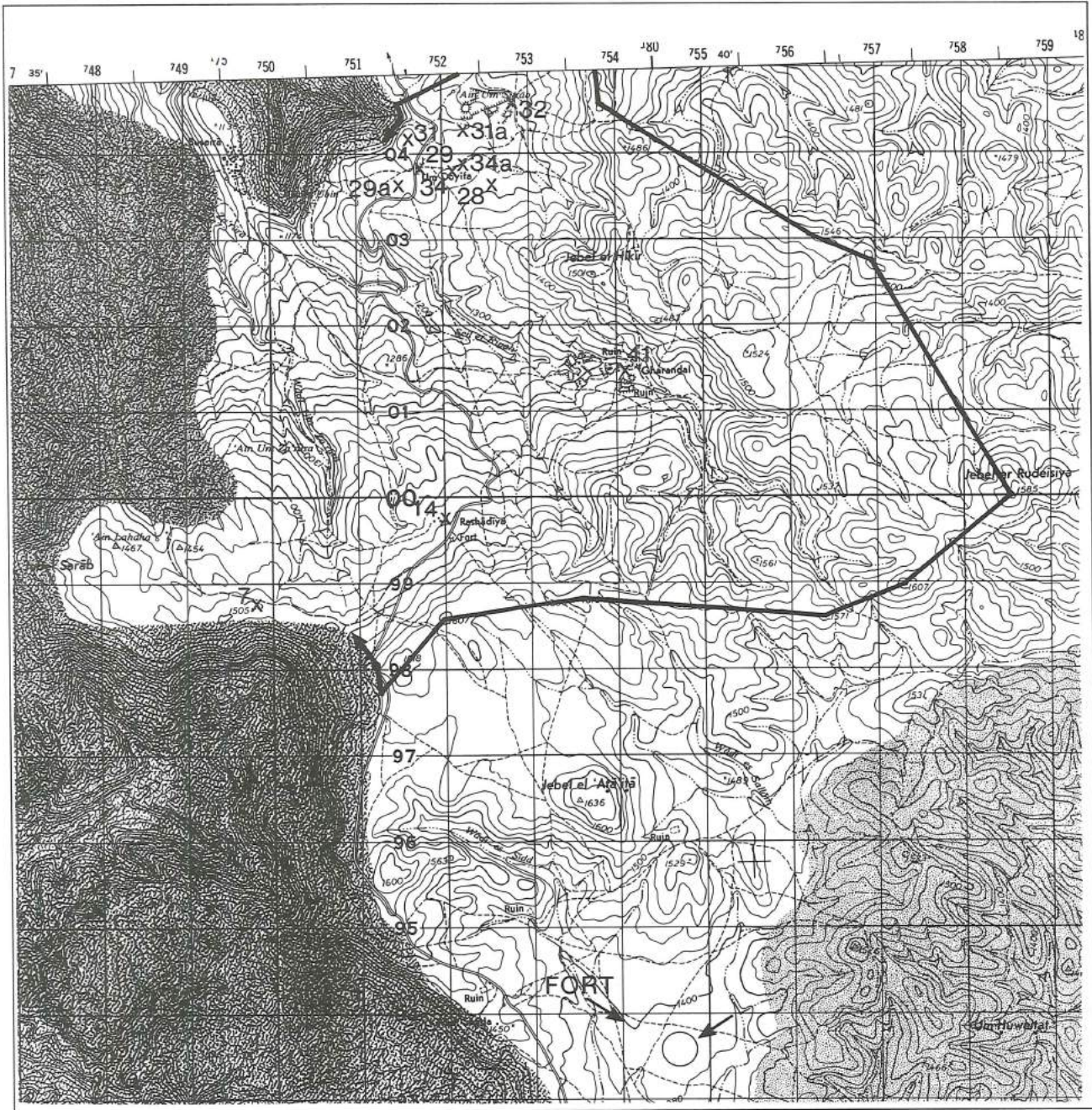
Khirbat Sarāb was visited by Glueck (1935: 98, Site 187) but he found no pottery and described a "small, completely ruined

1. I am grateful to Alan Walmsley for his kind invitation to work with him and for his comments on an earlier draft of this article.

2. Since 1992, the Australian Research Council has funded a project, Remote Sensing for Archaeology in the Middle East, the core of which has been the systematic analysis of some 4000 vertical air photographs of Jordan. To date over 25,000

sites have been identified. Preliminary analysis arising from parts of this project can be seen in Kennedy 1996, 1997b, 1998a; cf. 1995, 1997a, 1998b, *forthc. a*, *forthc. b*, Kennedy and Freeman 1995.

3. Ground verification was carried out by the author, Walmsley and Jihad Darwish of the Department of Antiquities.



1. The Gharandal Survey area showing the location of sites discussed in the text. N.B. the very dark toning on the left is where very steep slopes are rendered by close contours.

site, with building stones similar to those of Khirbat Nusraniyah” (below).

At Umm Dāyifa Hart and Falkner (1985: 270, Site 113) report a village with dating evidence extending from the second century B C to the Ottoman period.

At Rās al-Hala, Glueck (1935: 95-95, Site 184; 179, pl. 17) reports an Edomite border fortress and Nabataean and Islamic sherds

(cf. Hart and Falkner 1985: 270, Site 112).

For Rushdiyeh no publications are recorded in JADIS but Glueck (1934: 78) was there and reported an extensive site of the Nabataean, Roman and Ottoman period and there has been unpublished excavation on the church in recent years (below).

- Khirbat an-Nuṣrāniyya was also seen by Glueck who describes a large Byzantine

Table 1. Sites in the Gharandal Survey area recorded in JADIS (Palumbo 1994)

JADIS No.	COMMENT
2001.001	Umm Dayiea
2001.004	Kh. Sarab
2001.010	Buṣayrā
2001.012	Kh. el-Nasraniya. No information; unspecified structure
2001.013	Modern Buṣayrā
2101.001	Kh. Gharandal
2101.002	Ras el-Hala
2101.010	Rushdiyeh. No information published
2101.011	Kh. Nusraniyeh
2101.012	No information; unspecified structure
2101.013	No information; unspecified structure
2101.014	No information; unspecified castle
2101.019	Qal'at er-Rashadiyah. No information; unspecified palace
2101.021= 2001.001	Dari Sahabi Hareth bin Umeir el-Azdari. No information; unspecified "Wadi Darīh". Error in grid reference?

and Medieval Arab site (1935: 98).⁴

- Qal'at ar-Rashādiyya provides no information but the code identifies a "pa-lace". The location is very close to that of Rushdiyeh (above) and one may suspect it is the same site here being recorded in JADIS from the entry on the 1:50,000 map. The "palace" may be an error for the "fort" marked there.

Sites Recorded on the Air Photographs

Every part of the survey area was covered by one or more of a total of 15 frames, all at a scale of c. 1:25,000. They were taken in 1953 in four sorties on four days at different times of the day. Most were taken around midday when shadows were smallest, glare highest and the landscape would seem very "flat".

Table 2. Frames in the sorties covering the Gharandal Survey area.

Sortie nos	Frames	Date	Time
15.032-035	4	10 July 1953	c. 12.45
25.034-037	4	17 July 1953	c. 09.45
43.023-025	3	11 September 1953	c. 11.30
47.116-119	4	16 September 1953	c. 12.45

4. There is a problem here as the grid references in JADIS place this site about 4 km due E of Buṣayra rather than 4 km SSE as Glueck contends. Moreover, Glueck then locates Khirbat Sarāb 3 km SW of an-Nuṣrāniyya. Khirbat. Sarāb is presumably correctly located beside Jabal Sarāb marked on the 1:50,000 map. That is only possible if an-Nuṣrāniyya does indeed lie SSE of Buṣayra as Glueck says and the location given by JADIS is corrected as shown in parenthesis on Fig. 1 to place it beside what the modern map calls 'Ayn Umm Za'rūra, 2 km W of ar-Rashādiyya (Glueck mentions a spring just W of Nusraniyah). The problem is compounded by the Archaeological Map (Karak

Sheet) of Jordan which places "Kh. en-Nasraniyeh" about 4 km W of ar-Rashādiyya, on the scarp where the air photographs show some faint traces of what might be rectilinear buildings. Worse still, there is an 'Ayn Umm Sarāb on the 1:50,000 map (Map 3151.3: YV524045) and a Khirbat en-Nusraniyeh to its NNE (Map 3151.4: YV569143) - the latter, however, is 11, not 3 km away and cannot be the same site.

The archaeological map records a "Kh. Beitun". The site is not in JADIS or Glueck. Its location on the map is approximately where I have identified Site 26.

The general strengths and limitations of these photographs have been described elsewhere (Kennedy 1998a: 42-46; 51-55). In interpreting the photographs, "site" was defined as an apparent man-made intrusion in the landscape which there is reason to believe is pre-1919 in date (cf. Kennedy 1998a: 50-51).

A total of 50 sites was recorded (App. 1), more than trebling the number known to JADIS. The site types recorded range from a few which may be "modern" (1919-1953) but deserve checking, to several which have every appearance of much greater antiquity. Gharandal (Site 41) is the most important in terms of this survey, the present village having not yet developed to obscure parts of the ruins. Buṣayra (Site 30) is disappointing but in contrast, Site 31 nearby would be well-worth closer examination. Also worth investigation are the many small dark spots noted on several frames. Elsewhere these have often proved to be cairns or, in a few instances, collapsed towers. Most sites appear on more than one frame. Especially interesting from the point of methodology is Site 42 which is visible on only a single frame although the area is covered by four frames. Significantly the frame on which it does appear was taken relatively early in the morning implying a low wall visible only early in the morning when there was a sufficient shadow.

Not recorded individually is the evidence for agriculture. Many fields are plainly in current use but others may be the remnants of an older disused system. A selection of field walls in various areas would repay investigation to see if the walls themselves appear recent, old, or recent overlying old.

Comments on Individual Sites (Additional to Brief Remarks in Appendix 1)

The purpose of the ground work was to verify the existence of sites identified on the air photographs, to explain their appearance there in terms of what was visible on

the ground and to evaluate the contribution made by the aerial view. No artifacts were collected and no attempt was made to record the site. That will be the task of the subsequent field survey. Numbers are those in Appendix 1; the addition of a letter to a number (e.g. 29A) indicates a site found on the ground in the course of verification but which had not been identified as a site during the photo interpretation.

The first group of sites checked on the ground lie in the SW of the survey area on a tongue of the plateau just above the Wādī Ḍānā:

Sites 1-6: None of these could be traced on the ground as the area is being extensively quarried to a great depth. However, some may still survive on higher ground beyond the quarry. George Findlater (pers. comm.) subsequently described having seen well-preserved sites in this area which may well include these. It is in this area that Glueck apparently saw the site he called Khirbat Sarāb.

Site 7: The only site actually seen on this tongue was preserved as a partly bulldozed island of rubble on the edge of a large quarried area. The nature of the site is unclear but its location offered wide vistas to the S across the Wādī Ḍānā and the valley and probably W, N and E across the plateau of this peninsula. Masonry and numerous sherds were noted across an area of c. 1 ha.

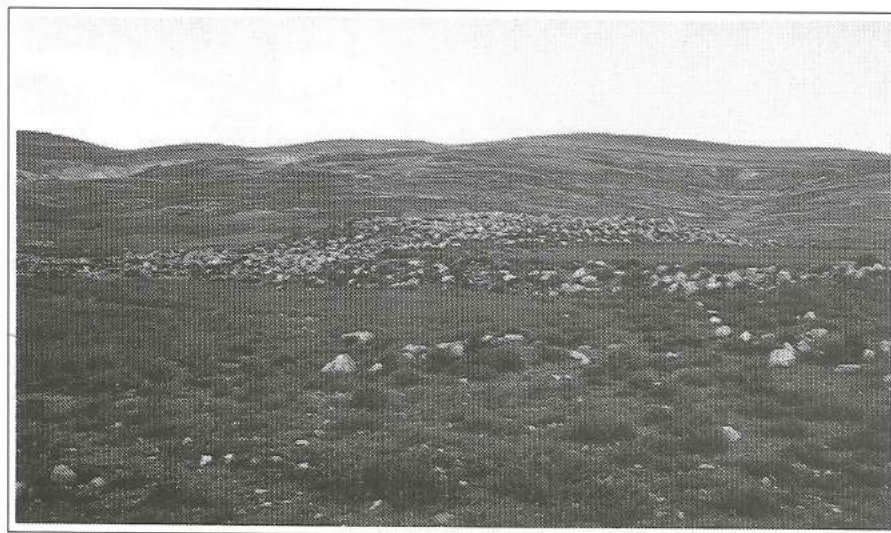
The Second Group Lies in the NW:

Site 28: Plainly visible on the ground as a large rubble heap on the skyline (Figs. 2 and 3). Proved to be on a raised platform of the slope with extensive views to N, W and E. Well-built walls forming a large rectangle within which lies a square/ rectangular structure. There is a smaller, detached, square structure on the NW.

Site 29: A shrine to a Muslim saint of the early seventh century AD, al-Harith ibn 'Umayr al-Azdi, which has recently been rebuilt and walled in. Seemingly popular



2. Air photograph of the area north-west of Gharandal showing several sites as they appeared on 16 September 1953. The photo shows clear traces of structures and enclosures and a possible street winding through Site 31. At ground level the foundations of numerous buildings are clear (cf. Fig. 5) (HAS 47.120).



3. Site 28 from the west (May 1997).

and ancient. This this presumably the Dari Sahabi Hareth bin Umeir el-Azdari recorded in JADIS.

Site 29A: Visible on the photo but interpreted as probably natural (Figs. 2 and 4). A rubble heap on hilltop SW of 29. Inspection revealed it similar to but smaller than 28 – a

well-built, rectangular structure on raised ground surrounded now by ploughed land.

Site 31: On a hilltop overlooking a steep drop into a valley below. Easily located, substantial and well-preserved remains in a lozenge shape, c. 250 x 250 m (Figs 2. and 5). An important site. From the photo it



4. Site 29A from south-east (May 1997).



5. View of Site 31 from the east (May 1997).

should be possible to identify the main areas of structures as opposed to the southern part where the walls are seemingly more crudely built and intended as terrace walls only on the steep slope.

Site 31A: Not noted in the photo interpretation (Fig. 2). On a tongue-like promontory E of 31. A few sherds on the plateau. The modern house at S end may overlie a hint of a small square structure which appears as light toning on the photo.

Site 32: Significant spring with a few houses nearby (Fig. 2). The region around the spring has been bulldozed. Spring water is channeled westwards to irrigate land to S of that channel. It would be worth investigating this irrigated area on the ground.

Site 34: The trace on the photo seemed

on inspection to be no more than a rock outcrop (Fig. 2). The land around has been extensively ploughed, however, and in the field nearby lies half of a very large stone basin.

Site 34A: Possibly visible on the photo but not noted. The site was discovered on the ground beside the road just N of 34. Small square, well-built structure under rubble (Figs. 2 and 6).

Finally, two extensive sites:

Site 14: ar-Rashādiyya deserves close inspection. Along with Glueck's brief comments (1934: 78) the site was surveyed as part of the Dānā Archaeological Survey (Finlayson and Baird 1995; Findlater pers. comm). We may add the visible evidence



6. Site 34A. Small square rectangular structure partly damaged by roadworks.

on the ground of several massive columns, a stone basin - part, perhaps, of an olive press, architectural pieces and fragments of a Roman milestone from the *Via Nova Traiana* which runs nearby. Individual structures may be identified on the ground but the general form, size and distribution of these show well on the air photograph (Fig. 7). Especially important is the very large building at C (Fig. 8). Recent excavation by a team from Mu'ta University has revealed a church close to the road (Fig. 7, point D).

Site 41: The ancient village/ town of Gharandal shows clearly on the air photograph as an extensive area of ruins (Fig. 9). The site today is closely hemmed in by houses and been subject to over 50 years pressure from the human population. The photograph provides a useful guide to the former extent of the ruinfield and permits a few individual structures to be identified.

The opportunity was taken to investigate a problematic site identified on air photos of the region just S of the Gharandal Survey area. In the course of doing so another important site was noted. Both may be reported on here and included in the overall summary of results.

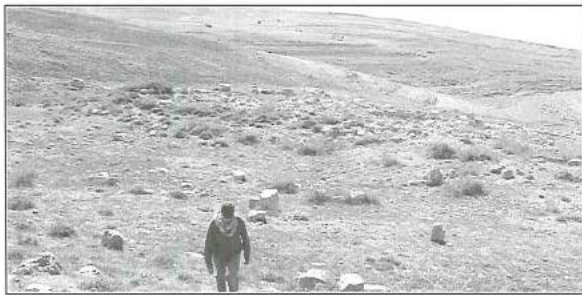
Circle: Examination of an air photo of the region just E of the new but large village of Khirbat Shada on the ridge of the King's Highway 6 km S of ar-Rashādiyya, revealed

a large circle some 800 m in diameter (Fig. 10). Although it appears on the 1:50,000 map (Sheet 3151.3: YU546936) as a perfect circle, the air photograph reveals several slight "wobbles". The site was easily located on the ground as it had been built from the basalt boulders which characterize this region and contrast with the bright red/orange soils and green vegetation (Fig. 11). It lies on a slight rise and was readily visible from a distance on the ground. On inspection it proved to consist of basalt boulders, 3-4 m wide and heaped about 50 cm high. They had a uniform patina of surface lichen and seemed long undisturbed. The circuit was traceable almost the entire length except on the E where a modern road has cut through it and beyond which the boulders have been removed for a short distance for land clearance. A few sherds were observed in several places and provisionally identified (by Walmsley) as "Late Antique". Although the sherds may well be no more than the outcome of field manuring, the circle itself looks old - certainly pre-1919. Another, almost identical in diameter and appearance was located on the air photos further n (Sheet 3151.1: YV806186).

Fortified site: the site was discovered by chance, not having been noted on the interpretation of the relevant air photograph. It was identified when examination of what



7. Site 14: Ar-Rashādiyya. The most prominent buildings are those of the late Ottoman period, well-preserved but lacking their roofs (A). The ancient remains extend under and to the S towards the modern police post (B). Several buildings can be identified, especially a very large one at C (cf. Fig. 8). The church is at D. Passing out to the NE is the trace of an old road, perhaps the original line of the Roman road. It appears again on the same alignment (Site 15) at a point where the modern road takes a different route.



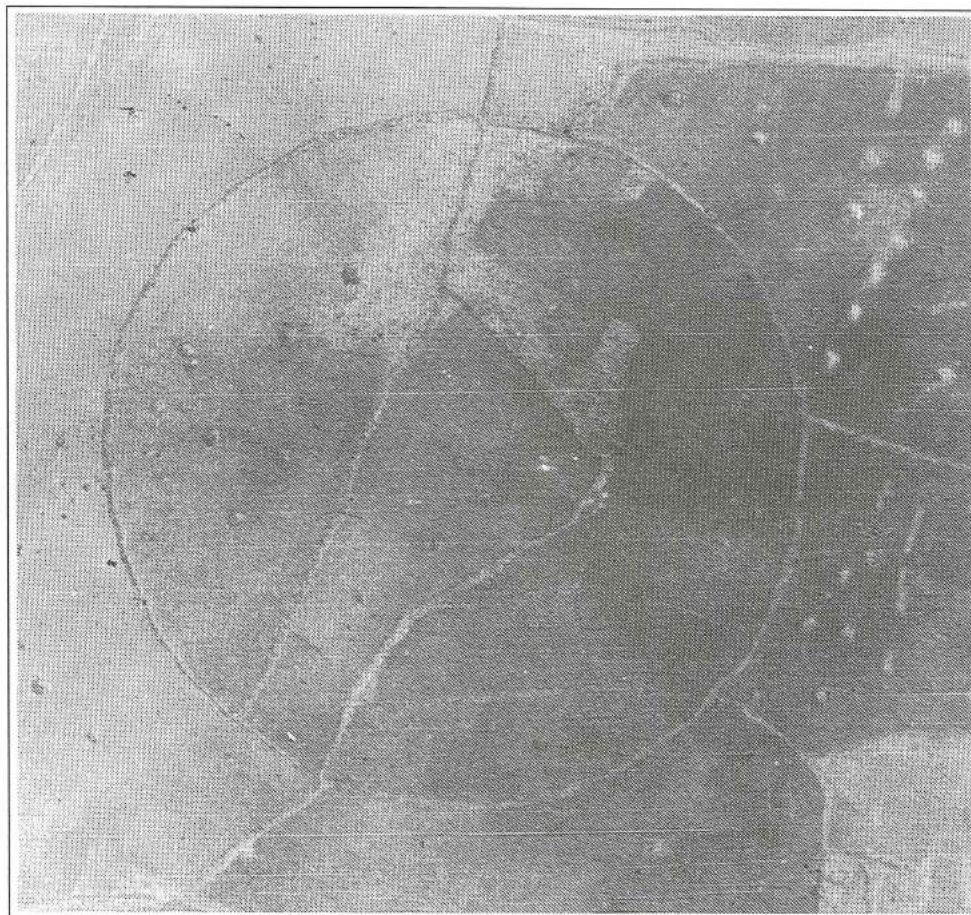
8. Site 14: Ar-Rashādiyya - the major building (C on Fig. 7) from the north-east seen (May 1997).

was taken to be a very high wall of basalt boulders on one side of a field track, proved to be the circuit wall of a large site (Sheet 3153.1: YU538941) (Fig. 12). The wall was some 2 m high and 2-3 m wide. The upper surfaces of the boulders were covered in a heavy patina. Two sides of an area of some 200 (E-W) and 150 m (N-S) were noted. The failure to note such a massive structure on the air photographs was probably due to

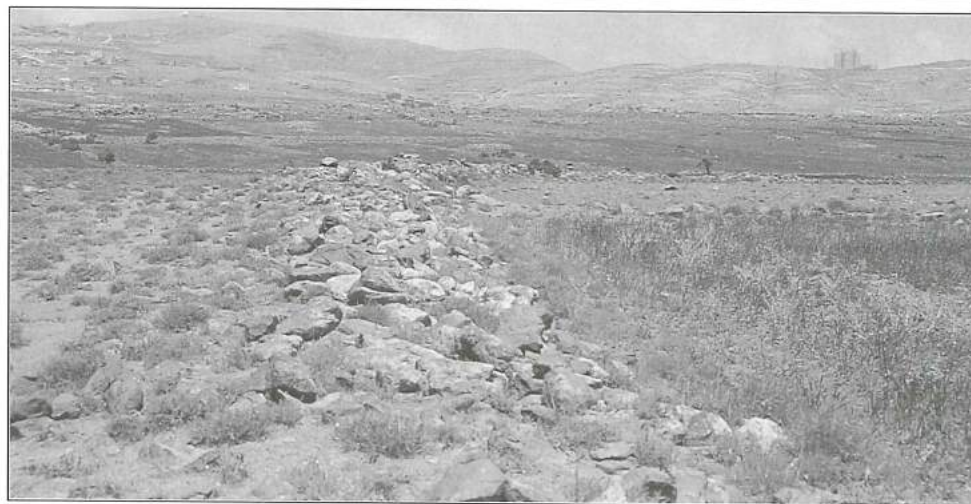


9. Site 41 - Gharandal from the air on 17 July 1953 (HAS 25.035).

the slight shadows on the air photograph and their direction – almost due west at 09.15 for a structure whose principal wall runs E-W. It was found that up-ending the



10. Air photograph of 17 September 1953 of the circle east of Khirbat Shada (HAS 25.039).



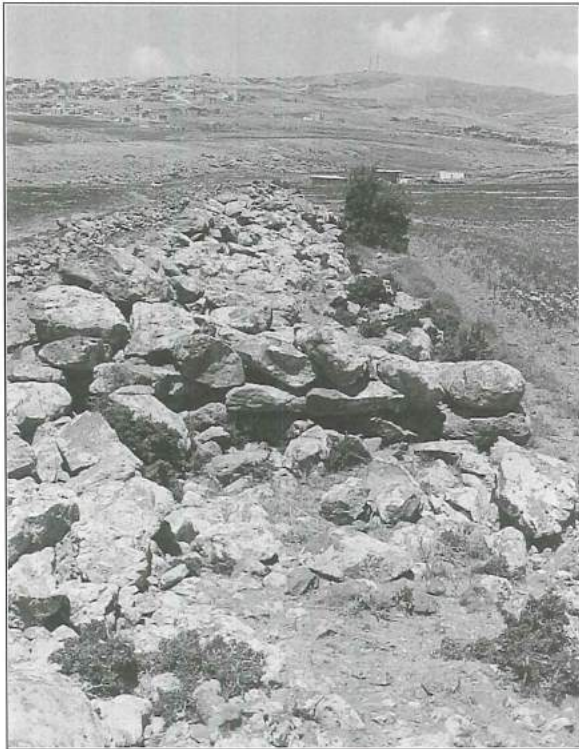
11. The circle east of Khirbat Shada as seen from the east (May 1997).

photograph, and placing the shadows in the “correct” visual relationship to the viewer, brought at least the S wall of the site into focus (Fig. 13).

Comment

As was to be expected with photographs taken for other purposes, at a relatively

small scale and at unsuitable times of the day, the results are mixed. The positive features are that the number of “sites” identified is three or four times the number previously known. Second, they show the extent and something of the nature of individual sites, for example Site 31. Site 14 (see Fig. 2) is a good example of where spe-



12. View looking west along the south wall of the fortified site between Khirbat Shada and the Circle. Immediately in front is an apparent gate. The south wall stands out more clearly if the book is turned end-for-end and viewed with north nearest the viewer (May 1997).

cific buildings can be distinguished and the photo may be used like a simple sketch plan. An obvious limitation is that some sites encountered by chance on the ground were not taken as such during air photo interpretation: Site 34A was overlooked entirely and Site 29A was noted but thought to be a natural feature. These instances suggest that interpretation might be less self-denying than has been the practice in deciding what to include. More serious is the failure to spot the fortified site discussed at the end. On the ground it appears as a clear and massive structure. Only after discovery was it "seen" on the photograph. A salutary warning that interpretation must be alert for the ways in which shadows are likely to reveal features (cf. comments on Site 42 above).

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13. Air photograph of 17 September 1953 of the fortified site between Khirbat Shada and the Circle (HAS 25.039).

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Appendix 1: Sites recorded on air photographs of the Gharandal Survey area.

N.B. Sites have been "starred" to give some guide to their relative importance *as they appear in the air photograph.*

	Stars	Name and description	Photo nos
0001		Cairns? Scatter of dark spots amongst scrub	43.023; 024; 025
0002		Square enclosure. Possible modern stock pen	
0003		Area of disturbed ground	
0004		Area of disturbed ground	
0005		Small circular enclosure	
0006	***	Large destroyed structure? Hilltop site, discolouration. Defensive wall beyond	
0007	*	Disturbed area on hillock with slopes marked by terracing	47.116
0008		Long wall	
0009		Terraces/ field strips - possibly modern	
0010		Small circular enclosure	
0011		Cairn (dark spot)? and cistern (dark rectangle)?	
0012		Disturbed ground near modern field enclosure	
0013		Disturbed ground - pale soil marks	
0014	**	RASHADIYA: Abandoned modern fort, long rect. structures (school?), traces of older (?) structures (?)	
0015	*	Disturbed ground around which road is deflected	47.117
0016		Faint long rectilinear field enclosure.	
0017		Spring/ reservoir	
0018		Dark disturbed area	
0019		Disturbed/ textured ground	
0020		Dark disturbed ground	
0021	*	Small square outline, beduin tents, fields	
0022		Dark disturbed area	
0023		Rectilinear features, perhaps natural	
0024		Square, unroofed structure	47.118
0025	**	UM DAYIEA: spring and/ or wadi deflection system	
0026	*	Cellular structure	
0027		Cistern? Beside track	47.119
0028	**	Faint rectilinear structure on hilltop	
0029		Small square unroofed structure at roadside	
0030	***	BUSEIRA: Modern village with extensive traces of disturbed ground (mainly to S) and enclosures all around	
0031	**	Settlement? Fields, enclosures set into lea of curving hillside. Irrigation by deflection?	
0032	*	AIN UM SIKAB: spring	

0033		Spring and channel	25.034
0034	*	Disturbed ground - hint of ruin?	
0035		Cairn? Dark spot	
0036	**	Hilltop ruins - faint trace, disturbed surface	
0037	**	Disturbed surface on hilltop, traces of outlying walls	
0038		Possible small rectilinear structure	
0039	**	Hummocks on hilltop	
0040	*	Discolouration, unevenness on hilltop	25.035
0041	*****	GHARANDAL: A few modern houses around an area of garden fields. Extensive area of ruins of ancient village to SE measuring c. 500 x 200 m.	
0042	*	Large, irregular circle, c. 120 m diameter. Only visible on one frame!	25.035
0043		Cairn/ tower. Tiny cellular enclosure	
0044		Waterhole? Pale area with black spot at centre	
0045		Walls - two straight, long stretches along hill edges - channels?	25.036
0046	*	Cairns/ Scatter of dark spots on high ground	
0047	**	Circular enclosure of hill-top. Beduin tents nearby	25.036
0048	**	Old road alignment between Rāshadiya and Gharandal (= <i>Via Nova Trainana</i> ?)	
0049	*	Ancient road? Running eastwards from Gharandal	15.034
0050	*	Faint traces of possible rectilinear structures on scarp with steep drop to W.	43.024